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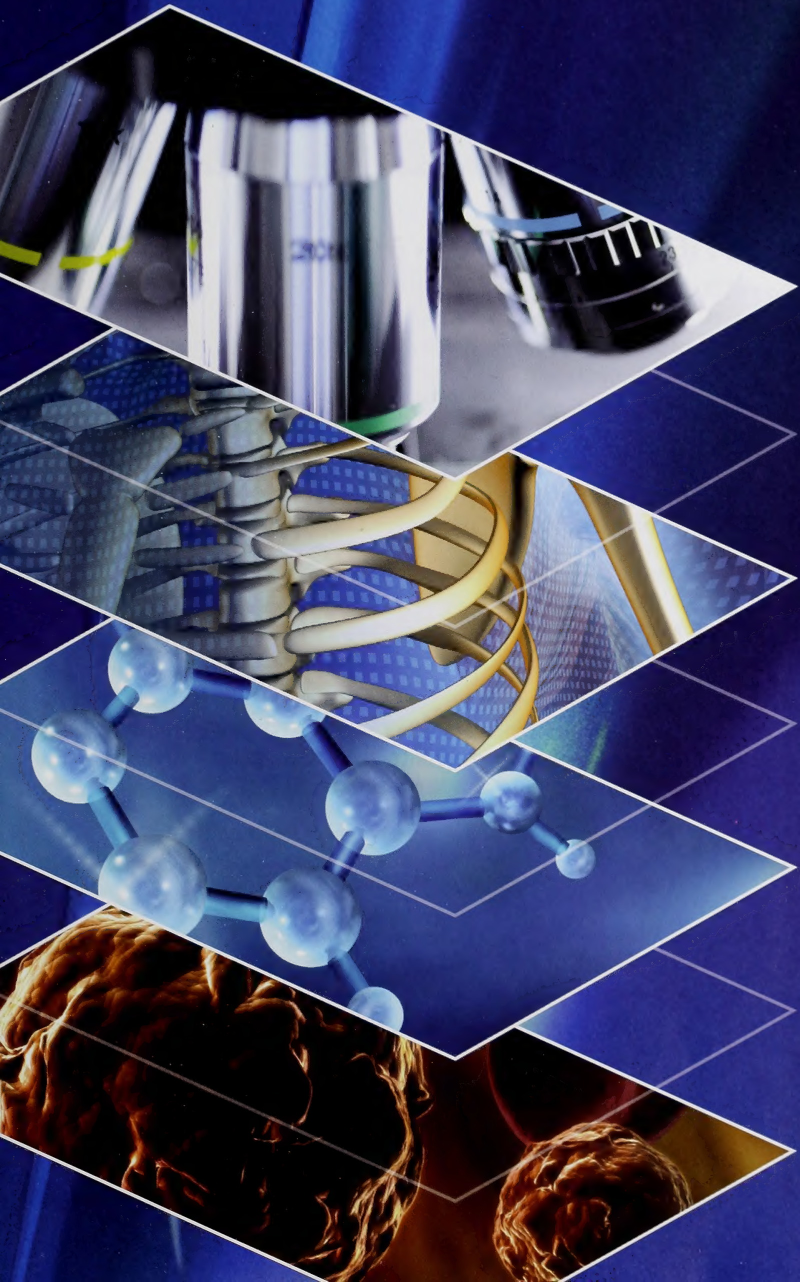
Life Sciences Imaging in Alberta



Alberta
Life Sciences Institute

Although sometimes unseen, life sciences imaging is at the core of a spectrum of advances in medical science and Alberta is home to one of the world's strongest group of imaging researchers. The province has more than 300 research scientists and medical doctors focusing on the development and application of new imaging technologies. These experts are located at several internationally known research institutions located at the Universities of Alberta, Calgary and Lethbridge.

The definition of life sciences imaging in Alberta is broad yet inclusive - it ranges from primary research into the structures and properties of individual molecules through to the translation of research into clinical care practices. Most importantly, all of this research ultimately results in better diagnostic imaging, therapeutics, and improved patient care.

The province has more than 300 research scientists and medical doctors focusing on the development and application of new imaging technologies. These experts are located at several internationally known research institutions located at the Universities of Alberta, Calgary and Lethbridge.

The Alberta Advantage:

It's Not Just Oil and Gas

This province celebrates several advantages that make it one of the leading centres for imaging research. A few of the many Alberta advantages for imaging research include:

- A concentration of key scientists with international reputations;
- An array of state of the art equipment that is dedicated to both primary research and the development of clinical procedures;
- A range of funding opportunities from provincial groups such as the Alberta Heritage Foundation for Medical Research, the Heart and Stroke Foundation, and the Alberta Cancer Board as well as incremental, complementary grants from federal agencies;
- A collaborative research approach - researchers work in multi-disciplinary teams consisting of scientists, clinicians, engineers and technologists to create and deliver improvements in healthcare based on imaging research;
- A highly supportive work and university environment;
- A province with an excellent quality of life.

In the following document, some of Alberta's key scientists and research infrastructure elements are described to illustrate the breadth of depth of imaging research in the province.

Alberta Leads in Imaging Research

The Alberta Life Sciences Institute (ALSI) has been active in highlighting those areas of life science that this province considers to be core assets and life sciences imaging is one of those fields where Alberta has developed a critical mass of the world's best researchers and facilities.

The research interests in life sciences imaging are as diverse as the field itself. Scientists in Alberta can be found at all points of the spectrum, from primary to translational research. Whether it's protein structure analysis using x-ray crystallography or the development of nanoparticle-based imaging contrast agents or new hybrid imaging modality research, all of these areas represent elements of life sciences imaging research that are found in Alberta. Although the range of interests is great, Alberta's researchers have core strengths in the areas of magnetic resonance imaging, confocal microscopy, positron emission tomography and computed tomography.

One of the keys to Alberta's success in developing a strong core of imaging research has been the establishment of different groups that are focused on specific aspects of imaging. Whether these groups are tied to institutions providing clinical care or attached to universities conducting research, they all have unique attributes that allow them to attract and retain some of the best research minds. The following are some of the key groups located in Alberta that are consistently asked to collaborate with international research groups from well-known and respected universities.

Alberta Cardiovascular and Stroke Research Centre (ABACUS)

ABACUS, located within the Edmonton-based Mazankowski Heart Institute, uses imaging to focus on cardiac issues such as acute coronary heart disease, heart failure and congenital heart issues. Within the ABACUS group, there are up to 30 researchers and post-doctoral fellows, although there are approximately 150 researchers in total accessing the imaging infrastructure. ABACUS works closely with the University of Alberta Cardiovascular Translational Research Centre as well as the adjacent In Vivo NMR (nuclear magnetic resonance) Research Centre.

ABACUS is unique in that it has an array of clinical imaging that is dedicated to research; therefore, researchers and industry studies associated with this organization have access to and do not have to compete with clinicians for the use of the equipment.

Key Infrastructure Elements:

- 64-slice CT (computed tomography) scanner
- Robotic, stereotaxis cath lab
- CT/SPECT (Single photon emission computed tomography)
- 3 NMR magnets (clinical human models, In Vivo NMR Research Centre)
- Echocardiography machine
- Confocal microscopy

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Alberta Synchrotron Institute/Canadian Light Source (ASI/CLS)

The Alberta Synchrotron Institute was originally created to help build the Canadian Light Source (CLS) synchrotron facility in Saskatoon and train Alberta-based scientists in these technologies. The group now has a membership of approximately 35 primary investigators and post doctoral fellows working in the fields of spectroscopy, x-ray spectroscopy, small-angle x-ray scattering and the internationally recognized protein crystallography. End applications of this work often focus on the development of pharmaceuticals.

Located at the three largest Alberta universities, researchers have access to beam lines at the University of California, Berkeley and the CLS. Through this organization, researchers not only have travel costs and access fees covered, but they also gain essential rapid access to synchrotron resources.

Key Infrastructure Elements:

- Access to Canadian Light Source (Saskatoon)
- Access to UC Berkley Synchrotron
- High speed fibreoptic research network between Alberta and CLS
- Terabyte-level data storage

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Researcher Profile

Michael James, D. Phil. (Oxon)

After completing undergraduate and master's degrees at the University of Manitoba, Dr. James moved to historic Oxford where he studied under Nobel Prize winning Dr. Dorothy Hodgkin. After attaining his D. Phil., Dr. James moved to the University of Alberta to complete a post-doctoral fellowship in the Chemistry Department and ended up joining the Biochemistry Department at the University of Alberta in 1968.

Dr. James' interest in structural biology involves determining the structures of biologically important molecules. Using x-ray crystallography, he is able to determine the three-dimensional structures of proteins and other macro molecules. The application of his research is in finding new treatments for tuberculosis (TB) and hepatitis-C. With two million people dying of TB every year and eight million new cases identified, he is trying to determine the structure of as many proteins in the TB genome as possible in order to develop new antibiotics. On the commercial front, Dr. James is also working with a small Canadian pharmaceutical firm to develop an anti-viral drug for hepatitis-C.

Even as a post-doc, Dr. James knew that the Biochemistry Department had an excellent reputation and over the years, that reputation has only grown. Despite offers to conduct his research elsewhere, Dr. James felt that no other group was better than the colleagues and mentors that he experienced at the University of Alberta. Dr. James continues to enjoy working with his students, both from Alberta and around the world, many of whom have gone on to accomplish some of their own great research.

Canadian Centre for Behavioural Neuroscience (CCBN)

Located in Lethbridge, this 60,000 square foot dedicated facility houses a broad range of multi-disciplinary neuroscience research. Approximately 20 neuroscience researchers work with physicists and chemists in this new facility. Their research focuses on animal and human models for neurological disorders, namely stroke, dementia, addiction and Parkinson's. They also study brain development and those factors that influence neurological disorders.

Leading research has been conducted that examines the changes of brain structures associated with neuron disorders. In addition, both large and small pharmaceutical companies find their pre-clinical assessment of drugs and models of disease to be of great value.

Key Infrastructure Elements:

- NMR
- 3T MRI (human)
- 4.7T MRI (small animal)
- 128 Channel EEG/ERP system
- Confocal & deconvolution microscopy
- Electron microscopy

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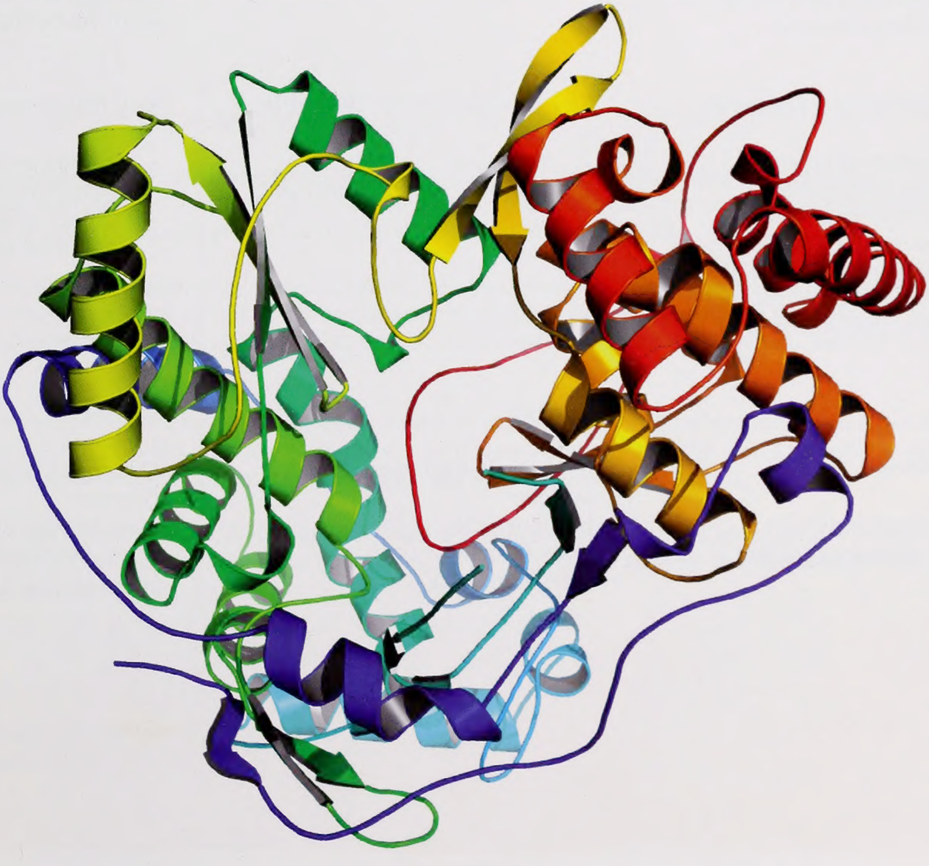

Centre for Advanced Technologies

The University of Calgary's Centre for Advanced Technologies was designed to provide researchers with a wide variety of high-quality research platforms and complementary services at cost-effective rates. Three key imaging services are available to biomedical researchers located in Calgary and across the country.

Microscopy and Imaging Facility

This facility provides access to advanced microscopy as well as provides services to help principal investigators (PI's) and industry partners achieve their research goals.

Working with PI's, this centre has helped develop advances in diabetes, stem cell and immunology processes. Non-life science applications include fuel-cell, pipeline, and energy related geology research.

Key Infrastructure Elements:

- Environmental scanning electron microscopy
- 2 transmission electron microscopes (200kV field emission analytical & 120 kV)
- 3 atomic force microscopes
- High-end light microscopy

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3D Morphometrics Lab

Using one of the largest micro-CT lab infrastructures in the world, this group focuses on high throughput phenotypic analysis of volumetric data including the development of phenotype analysis software tools.

Applications of this research have centred around treatment of osteoarthritis, cleft lip and cancer research.

Key Infrastructure Elements:

- 2 micro-CT (animal)
- 1 in vivo, micro-CT (human)

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Sun Centre of Excellence for Visual Genomics

This centre provides a computational platform for the study of structural biology and bioinformatics. Having developed the first object-oriented human body model, research in this lab looks at the modelling of medical conditions as well as the analysis of volumetric data from imaging technologies. This group's IT expertise helps them specialize in software and middleware development that can assist researchers.

Key Infrastructure Elements:

- 3-D immersive virtual environment (Cave)
- Object-oriented model of human body

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Researcher Profile

Craniofacial Osseointegration and Maxillofacial Prosthetic Rehabilitation Unit (COMPRU)

The Craniofacial Osseointegration & Maxillofacial Prosthetic Rehabilitation Unit based at Edmonton's Misericordia Community Hospital is a world leader in reconstructive medical science. With a focus on the head and neck, COMPRU works with academic and industry partners across the province and around the world.

The Medical Modelling Research Laboratory within COMPRU, led by Diana Shaw, PhD, specializes in solid modelling and rapid prototyping to improve patient outcome. Three dimensional imaging data is transmitted to computer-aided design packages and rapid prototyping machines in order to manufacture custom implantable devices, such as those used in cranioplasties.

COMPRU directs their research in the translational environment as they improve surgical procedures to ultimately create better functional outcomes. COMPRU was one of the first healthcare institutions in the world to register for ISO 9000 quality management process certification for its craniofacial and osseointegration activities.

Coupling COMPRU's highly collaborative and multi-disciplinary research team with its up-to-date infrastructure, this institution is able to find novel ways of improving approaches to reconstructive surgery that ultimately improve patient outcomes and overall quality of life.

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Image-Guided Adaptive Radiotherapy (IGAR) Program – Centre for Biological Imaging and Adaptive Radiotherapy (CBIAR)

As part of the Centre for Biological Imaging and Adaptive Radiotherapy at the Cross Cancer Institute and the University of Alberta, the IGAR Program was the first institution in the world to institute image-guided TomoTherapy cancer treatment. IGAR is now home to the invention, design and construction of the first real-time, MR-guided radiotherapy system. Not only will this new technology allow for the radiation treatment of cancer tumours that were previously not treatable by radiation such as those in the gastrointestinal system, but it will also significantly improve radiation treatments of other cancers (lungs, brain, prostate) and will dramatically decrease the number of visits required by patients.

Although CBIAR is home to a broad range of medical physicists, basic scientists and clinical researchers, it also has a strong academic component as the only institution in the world with three internationally accredited graduate and residency programs in medical physics.

Key Infrastructure Elements:

- 3T MRI/MRS (human)
- 9.4T MRI/MRS (animal)
- CT-guided cone beam linear accelerators
- TomoTherapy Systems

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Cross Cancer Institute (CCI)

In addition to its ongoing clinical program at the Cross Cancer Institute, the organization has a strong translational and clinical research element. The CCI is known internationally for having established the largest radioisotope therapy program in North America, and has a multi-disciplinary team of physicians, chemists, radiopharmacists and physicists. One of the key elements of the program has been the establishment of a PET (positron emission tomography) centre. Collocated in the Centre for Biological Imaging and Adaptive Radiotherapy (see opposite), the facility has an in-house cyclotron and GMP (Good Manufacturing Process) lab facilities that are used in the production of key imaging radiotracers. Research in this aspect of molecular imaging not only looks at the development of markers, but is also using imaging as a biomarker.

Key Infrastructure Elements:

- 64 slice CT scanner
- SPECT
- PET/CT imaging systems
- 1.5T MRI (human)
- Animal PET imager

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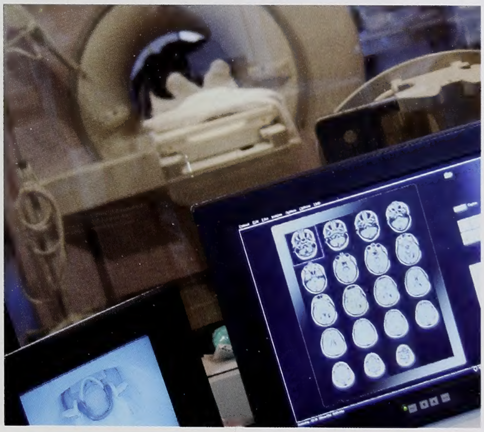

Researcher Profile

Sandy McEwan, MD, FRCP(C)

Originally from England, Dr. McEwan's career has focused on oncology and nuclear medicine. Moving to the Cross Cancer Institute in Edmonton in 1986, he is now the Chair of Oncology as well as the President of the Society for Nuclear Medicine.

His current research looks at the next generation of imaging tracers that will not only detect the presence of cancer, but will also be used to determine individual treatment plans based on the predicted responses to the treatment. Ultimately, he sees this molecular imaging work contributing to changes in practice, both in clinical procedures and pharmaceutical development.

Dr. McEwan's contributions to imaging in Alberta are many. He and his team have established a PET centre as well as a GMP manufacturing and research centre that are key to their imaging biomarker and radioisotope therapy program, the largest of its kind in North America.

When asked why he continues to pursue research in Alberta, Dr. McEwan credits the caliber of the people he works with, his research environment and the opportunity to make a real difference. In his words, "I couldn't have had this career in England."

Experimental Imaging Centre (EIC)

With a team of approximately 30 people, the Calgary-based EIC has two goals: to provide state of the art imaging modalities to the research community and to facilitate the translation of imaging technology into the clinic. The EIC works collaboratively with the National Research Council of Canada's Institute for Biodiagnostics (NRC-IBD), the University of Calgary's Faculty of Medicine, the Hotchkiss Brain Institute as well as a number of other institutes, faculties and universities around North America. Their current strength is in high field MRI (magnetic resonance imaging) and optical technologies, specifically for use in animal and human studies. Approximately 70 per cent of the applications focus on neuroscience (stroke, multiple sclerosis, brain function, cancer, and molecular imaging of neurological disorders), with the remainder of the work dedicated to musculoskeletal and cardiac issues.

Key Infrastructure Elements:

- 9.4T MRI (small animal)
- 0.2T MRI (large animal)
- Tomographic optical mapping system (human)
- Near IR spectroscopy (Human, animal)
- Fluorescent microscopy

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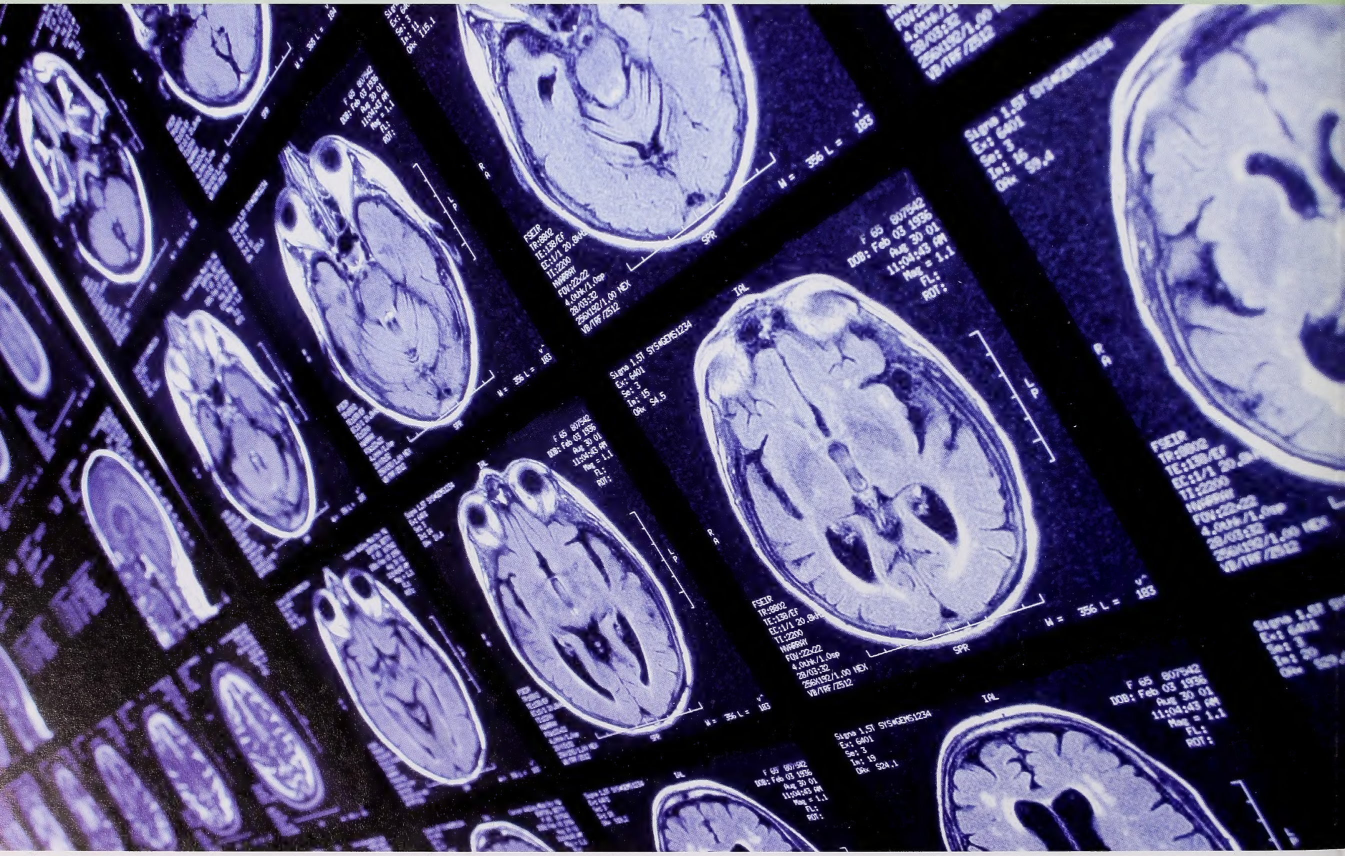

Hotchkiss Brain Institute (HBI)

The HBI was established to translate scientific discoveries and knowledge into applications within the fields of neuroscience and mental health. Working collaboratively with the University of Calgary, the Calgary Health Region and the Canadian Centre for Behavioural Neuroscience, the Hotchkiss Brain Institute engages approximately 140 principal investigators, 10 of whom focus on advanced imaging.

Current areas of study at the HBI include: multiple sclerosis, stroke, movement disorders, spinal cord injury, epilepsy, depression and schizophrenia. In addition to the state of the art equipment and internationally recognized expertise, the institute integrates the activity of researchers and imagers under a single administrative umbrella.

Key Infrastructure Elements (see EIC opposite):

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In Vivo NMR Research Centre

At 25 years of age, this University of Alberta institution is still at the forefront of life sciences imaging. With its three MRI machines, it has developed a specialty in not just MR imaging, but NMR spectroscopy at the animal and human scale. While some of the basic science researchers are investigating conditions such as spinal cord injuries and pressure sores, other clinical researchers use the centre's NMR spectroscopy facilities to look at the brain chemistry changes in patients with Parkinson's disease or psychiatric disorders. Other researchers use MR imaging to evaluate structural and functional changes in epilepsy and stroke.

Alberta Heritage Foundation for Medical Research has been a long term supporter of this facility which continues to produce leading NMR spectroscopy research in areas such as diffusion tensor imaging.

Key Infrastructure Elements:

- 1.5T MRI (human)
- 3.0T MRI (human)
- 4.7T MRI (human)

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National High Field Nuclear Magnetic Resonance Centre (NANUC)

Located in Edmonton, this national facility was established in 1999 by Dr. Brian Sykes and several other scientists. Today, people from across North America utilize the NMR spectrometers available through this institution. Although this facility is used for a broad range of research, biochemical and biomedical research remain at its core.

The four NMR spectrometers offered by NANUC and the three available through the University of Alberta's biochemistry department, facilitate a wide range of research. NANUC also offers workshops and courses nationally to train users in the biological applications of NMR.

Key Infrastructure Elements:

- 800 MHz NMR spectrometer (located at NANUC)
- 600 MHz NMR spectrometer (Institute for Biomolecular Design located in Medical Science Bldg)
- 600 MHz NMR spectrometer (Magnetic Resonance Diagnostics Centre located at NANUC)
- 600 MHz NMR spectrometer (Department of Biochemistry located in Medical Science Bldg)
- 500 MHz NMR spectrometer (located at NANUC)

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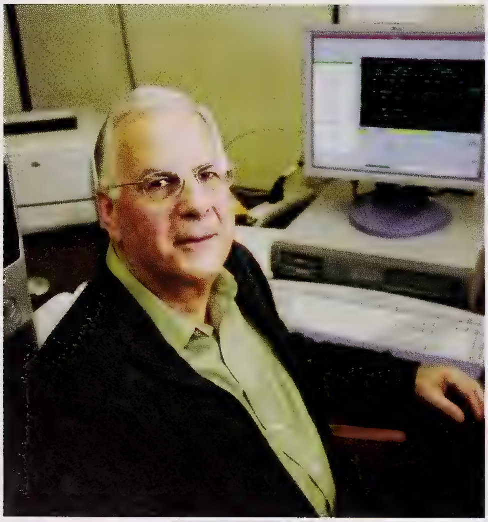

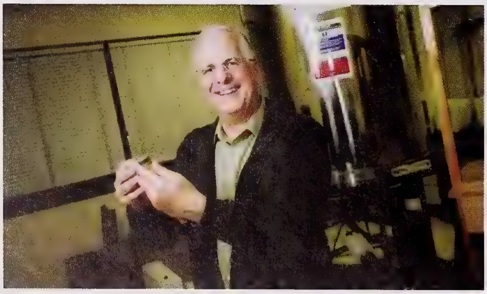

Researcher Profile

Brian Sykes, PhD

With experience from some of the world's best universities, Dr. Sykes moved to Alberta in 1975. After obtaining a PhD at Stanford and an associate professorship at Harvard, the formation of the Medical Research Council in Protein Structure and Function lured him to the University of Alberta in Edmonton. As a University Professor and the former chair of the biochemistry department, Dr. Sykes has over 25 years of research and over 450 publications to his name. Dr. Sykes is also the director of NANUC.

His work in molecular imaging focuses on protein structure and dynamics. In his words, "If we can see it and watch it move, we can better understand the function and then alter the function." Building on that approach, Dr. Sykes works in the cardiovascular field, looking at proteins in the human heart muscle and how they affect contraction. He and his colleagues were the first to determine the structure of the cardiac-specific, calcium-regulating proteins in the heart.

With one of the best biochemistry departments in Canada and the facilities available through NANUC, Dr. Sykes has helped to assemble an excellent team that represent world class strength in this area of research. This centre of excellence has graduated researchers that now populate universities around the world.

National Research Council of Canada Institute for Biodiagnostics (NRC-IBD)

The NRC Institute for Biodiagnostics has approximately 200 people located in its two facilities in Winnipeg, Manitoba and Calgary, Alberta. At IBD-West in Calgary, 11 investigators lead the research in three main areas: application of magnetic resonance imaging in neurosciences, development of new imaging techniques and molecular imaging for cancer research. The research at IBD-West comprises stroke, spinal cord injury, cancer, multiple sclerosis, Alzheimer's and skeletal cartilage.

The IBD has been responsible for pioneering work in the field of non-gradient MRI which has led to safer, cost-effective, higher resolution images from machines that are more patient-friendly. In conjunction with other institutions, IBD is also investigating the use of nanoparticles which are delivered to cancer sites by antibodies and then act as imaging contrast agents. In addition to the application research, IBD also has the skilled personnel and facilities to build any and all parts of an experimental MRI machine. IBD-West collaborates closely with University of Calgary researchers in many areas of MRI research such as Dr. Garnette Sutherland's intraoperative MRI and neuroArm (see profile on page 14). IBD-West collaborates as well with the Cross Cancer Institute, Edmonton on the application of MRI to cancer research.

Key Infrastructure Elements:

- 3T MRI (human, Winnipeg location)
- 7T animal MRI (Winnipeg location)
- 11.7T MRI animals MRI (Winnipeg location)
- 9.4T MRI (Calgary location, also noted in the Experimental Imaging Centre)
- 0.2T MRI (Calgary location, also noted in the Experimental Imaging Centre)

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Researcher Profile

Hans Vogel, PhD

Born in the Netherlands, Dr. Vogel obtained his PhD at the University of Alberta. After four years in Sweden, he was recruited by the Alberta Heritage Foundation for Medical Research and returned to Alberta in 1985.

Dr. Vogel conducts his research in structural biology with a primary interest in developing new classes of antibiotics. His specific interest is in elucidating the three dimensional structure of proteins and peptides, for application in the development of new antimicrobial and antiviral treatments. Dr. Vogel is also actively involved in metabolomics, an emerging research area where both the Universities of Calgary and Alberta are national leaders. NMR spectroscopy is an important component in measuring the levels of metabolites that are characteristic of disease.

Establishment of the well-equipped and well-funded structural biology group at the University of Calgary has been a major accomplishment for Dr. Vogel. Between the four NMR spectrometers in Calgary's Bio-NMR Centre, the equipment at NANUC in Edmonton, and access to synchrotrons through the Alberta Synchrotron Institute, he and his colleagues have a research infrastructure available to them that is rarely found around the world.

Working in an open and multi-cultural environment and being able to teach the best and the brightest of graduate students are some of the primary motivators for Dr. Vogel's continued research in Alberta.

National Institute for Nanotechnology (NINT)

This national institute is located on the campus of the University of Alberta in Edmonton. Nanotechnology enables the atom-by-atom design and fabrication of tiny structures that are very small, typically 1 to 100 nanometres. Using nanotechnology, the organization's 23 principal scientists study the interface between hard and soft materials and use various aspects of imaging to understand that interface. Although much of their research is concentrated in the areas of life sciences and medical technologies, their research teams are also involved in fields such as energy, information and communications technology as well as agriculture. Industry and researchers alike are also drawn to this organization due to its complement of well-maintained equipment and highly-qualified research support teams.

Key Infrastructure Elements:

- Scanning electron microscopy
- Transmission electron microscopy
- Atomic force microscopy
- Scanning tunneling microscopy
- Confocal microscopy
- Total internal reflection microscopy
- Infrared and Raman spectroscopy imaging

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Pharmacy Micro-Computed Tomography Imaging Facility (PCMT)

Located within the Faculty of Pharmacy and Dentistry at the University of Alberta, this research uses Edmonton's first in vivo micro-CT to study images of bone adaptation after pharmaceutical intervention. Although orthopaedic research dominates the lab, they also collaborate with other groups to study biomaterial-tissue integration, orthodontics, and pharmacokinetic renal clearance. The team members in this lab have become micro-CT application specialists and have developed the ability to solve problems ranging from life sciences to agriculture to geology. In addition to their development of some leading edge techniques in biomaterial measurement in bone generation, they also have industry knowledge of GMP and pharmaceuticals.

Key Infrastructure Elements:

- In vivo micro-CT Imaging Suite

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Seaman Family MR Research Centre

Located at the Foothills Medical Centre in Calgary, the Seaman Family MR Research Centre seeks to advance magnetic resonance imaging techniques in both basic sciences and clinical medicine. The principal research directions of the Centre are intraoperative and MR imaging at 3.0 Tesla. In addition to the well known neuroArm project which features image-guided robotic surgery, there are programs in functional MR imaging (fMRI), multiple sclerosis, vascular and stroke imaging, medical image processing and MR physics development. In the field of cancer research, the centre is developing molecular imaging agents that will increase the visibility of individual tumour cells and ultimately, become the source of therapy delivery and disease monitoring.

Key Infrastructure Elements:

- Intraoperative 1.5T MRI (human)
- 3T MRI (human)
- Advanced Medical Imaging - Processing Analysis Laboratory
- Vascular Imaging Laboratory

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Photo by Phil Crozier

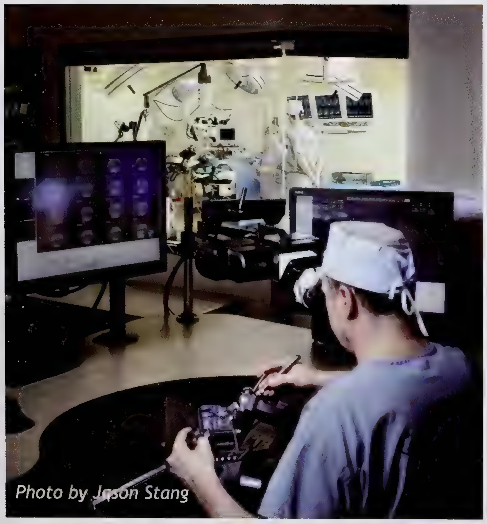

Photo by Jason Stang

Researcher Profile

Garnette Sutherland, MD

An Edmontonian by birth, Dr. Sutherland obtained his medical degree and fellowship at the University of Manitoba and the University of Western Ontario. Moving to Calgary in 1993, he was a professor and head of Neurosurgery for 10 years and now is a professor of Neurosurgery and project leader of intraoperative MRI and neuroArm.

In Canada, Dr. Sutherland's name is associated with the neuroArm project, which he characterizes as the meeting of rocket science and brain surgery. Working with MDA Corporation, the creators of the shuttle's Canadarm, and IMRIS Inc., a manufacturer of moveable MRI machines, Dr. Sutherland led the initiative to create an MR-compatible, image-guided robot that is capable of working within a high field superconducting magnet.

On the molecular imaging research front, Dr. Sutherland is collaborating with several National Research Council groups to create cell-specific, superparamagnetic nanoparticles that will bind to the antigens on cancer tumour cells. Visible to both fluorescent and MR imaging, they will provide the surgeon with the ability to detect individual tumour cells.

Dr. Sutherland credits the entrepreneurial attitude of Alberta with allowing him to tackle these large and challenging projects, saying "There are few places in the world where there is enough energy and good people to make these kinds of projects successful."

Stephenson Cardiovascular Imaging Centre - Libin Cardiovascular Institute of Alberta

As one of the key elements of the Libin Cardiovascular Institute, the Stephenson Centre has a mandate to move validated imaging approaches into clinical service and provide training. In its first two years of operation, this centre has not only built a successful research group, but now ranks among the top five clinics in the world for the number of cardiac MR scans performed. Researchers, cardiologists and radiologists work closely in a collaborative environment to translate molecular imaging research into clinical applications. Because of its leading edge approach, this group can assist industry with understanding new directions in imaging and validate new approaches against established methods.

Key Infrastructure Elements:

- MRI
- CT
- Nuclear camera
- Ultrasound

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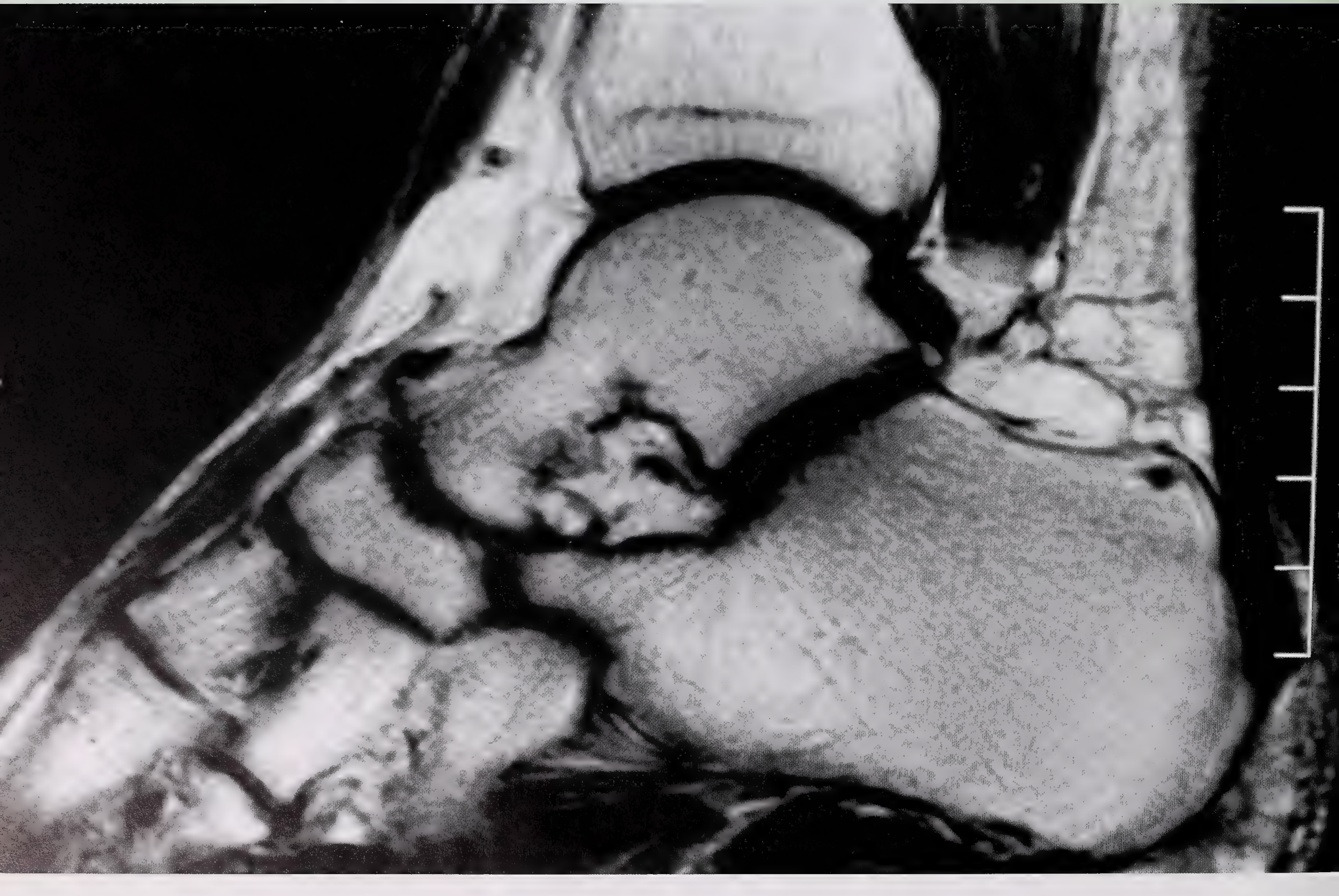
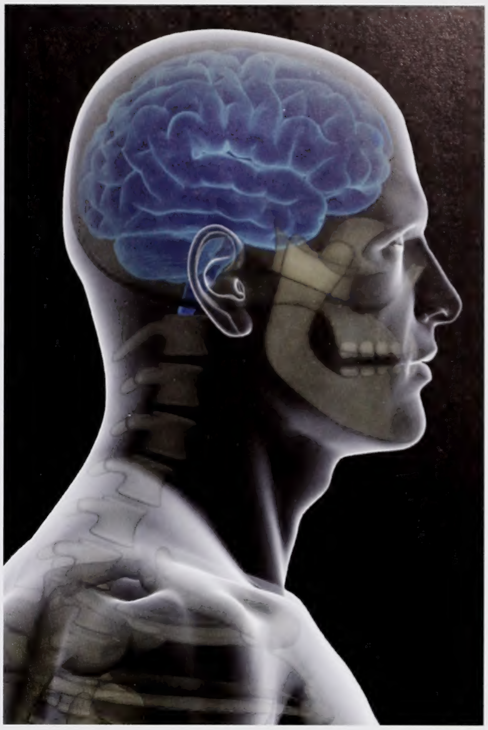


Uses of Life Sciences Imaging in Alberta



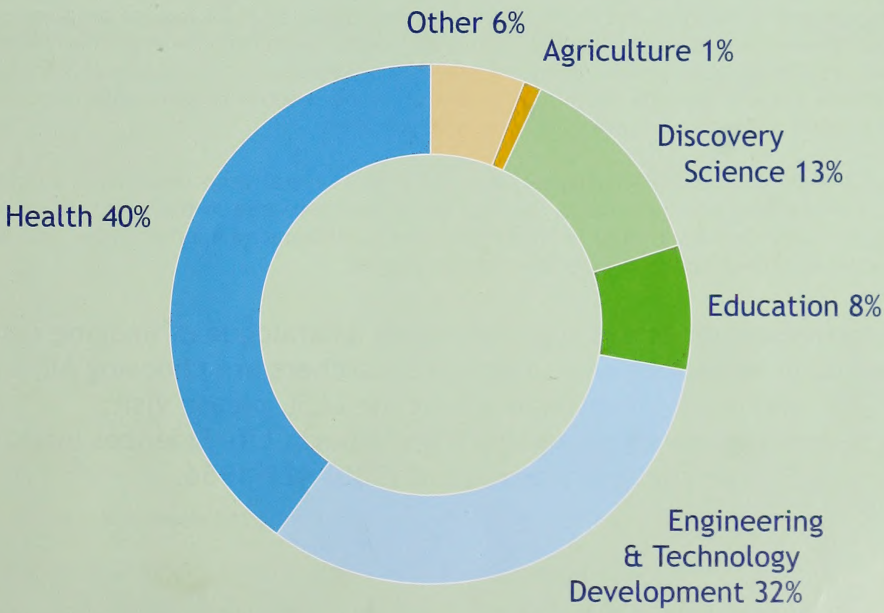
Alberta is home to a wide variety of imaging modalities and a recent survey of imaging researchers demonstrated how these are being used to improve the quality of people's lives. Approximately 300 researchers from the three major universities (Calgary, Alberta, Lethbridge), two federal research centres (NRC-IBD, NINT) and two regional health authorities (Calgary Regional Health and Capital Health) were questioned and according to the survey's findings, magnetic resonance imaging was clearly the leading modality with approximately half of the researchers using it in some form or another. When asked in what areas of research these modalities were being used, the researchers showed a clear preference for the fields of biomedical engineering, neuroscience, and cancer. The chart below summarizes some of the survey results by illustrating the depth of technology used by Alberta researchers and the breadth of its applications.

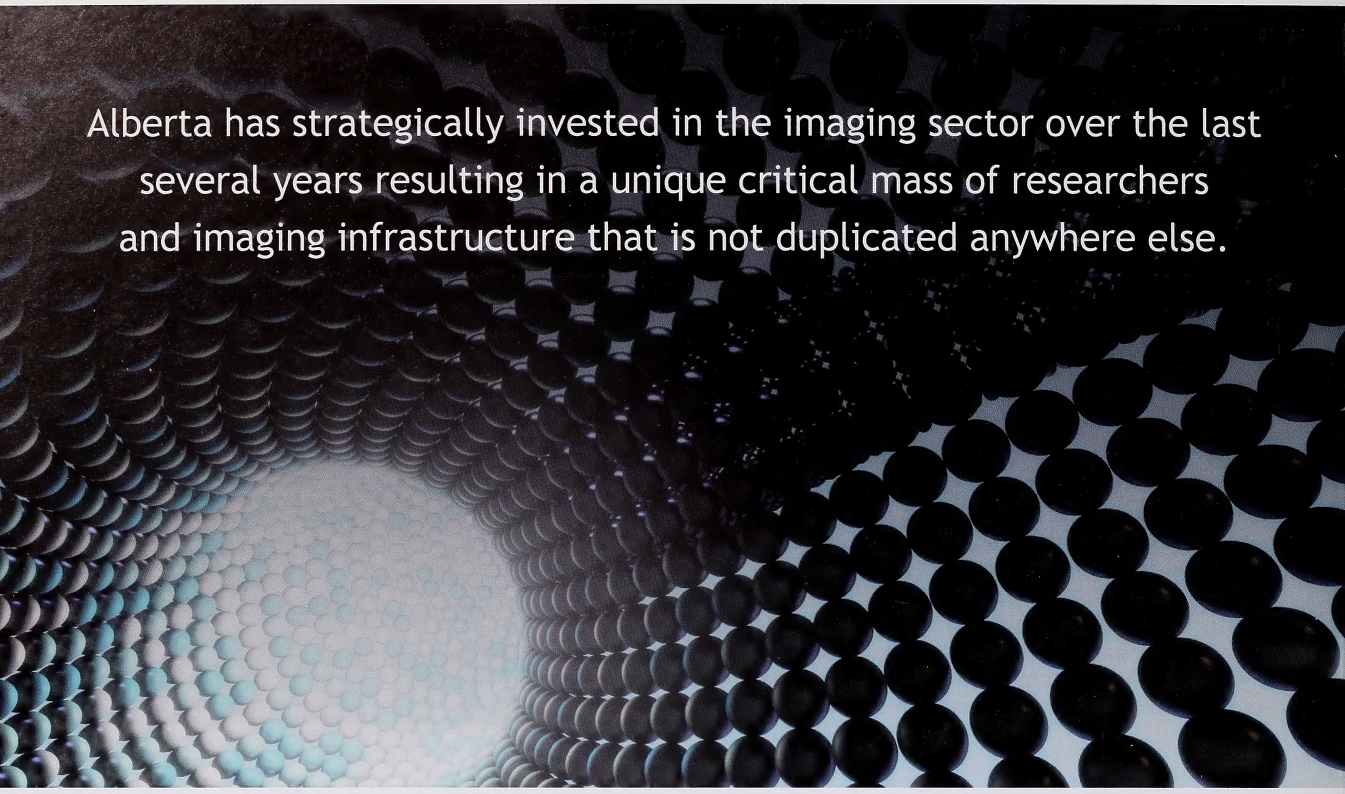
With these technologies being so important to imaging research in Alberta, it is no surprise that approximately 40 per cent of researchers surveyed also reported that they participate or assist in the advancement of the actual technologies themselves.

However, what stands out as a key feature in the imaging research landscape is the emphasis on translational research. The focus of these scientists and physicians in moving research from lab bench to bedside ensures that patient outcomes will continue to improve as a result.

Application of Life Sciences Imaging Technologies Research

Distribution of Imaging Research Applications in Alberta




Alberta has strategically invested in the imaging sector over the last several years resulting in a unique critical mass of researchers and imaging infrastructure that is not duplicated anywhere else.

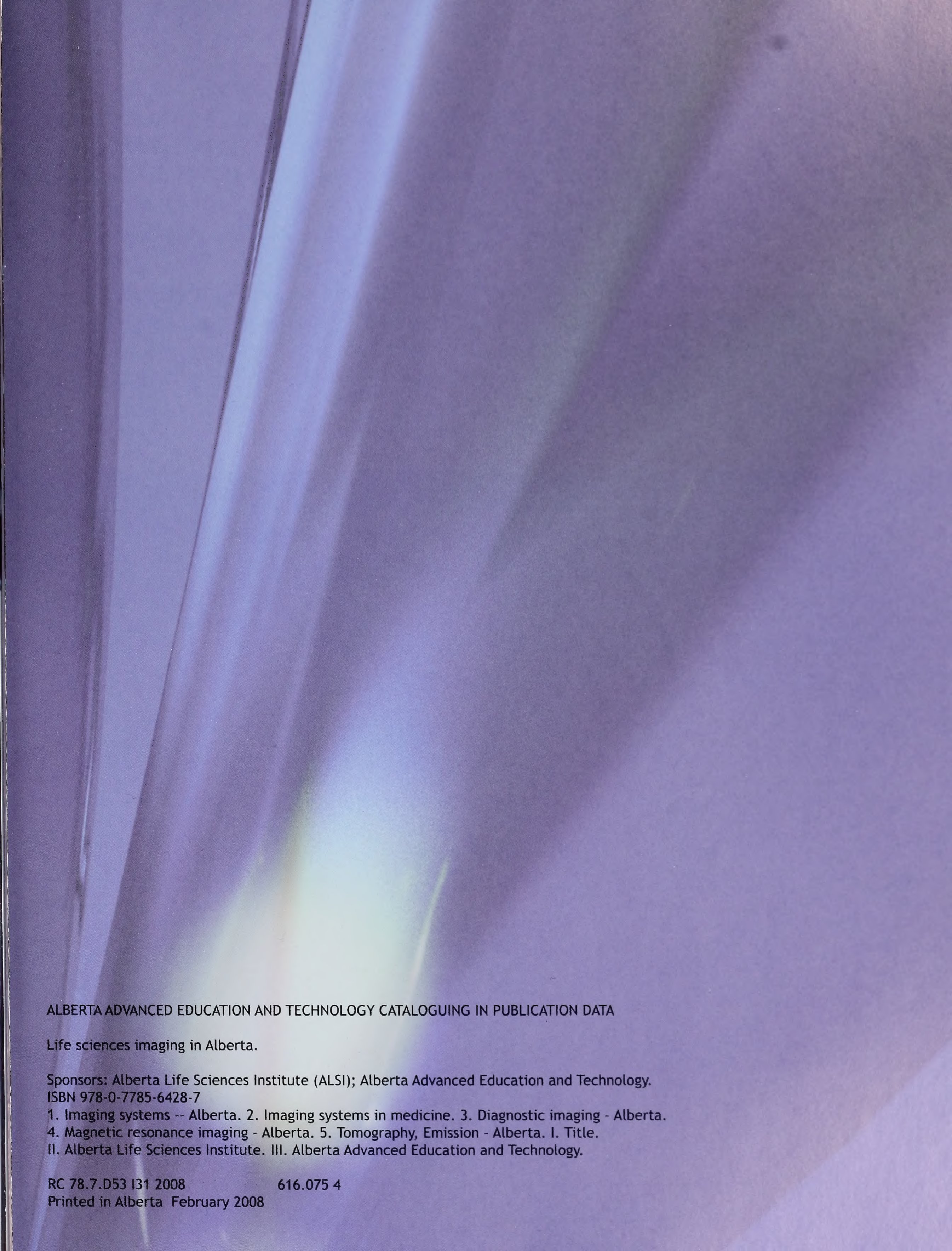
The Alberta Government - Strategically Investing in Imaging Research

Created by the Government of Alberta, the Alberta Life Sciences Institute (ALSI) focuses on advancing life sciences opportunities at the convergence of the traditional sectors of health, agriculture, energy and forestry. The institute works collaboratively with other government departments, industry, stakeholders and research institutions to enhance and expand Alberta's life sciences capacity. To this end, the ALSI has been active in shining a light on those areas of life science that this province considers to be core assets, especially imaging.

Alberta has strategically invested in the imaging sector over the last several years resulting in a unique critical mass of researchers and imaging infrastructure that is not duplicated anywhere else in the world. Its imaging researchers are counted among the world leaders in their fields and the open, collaborative approach they take provides an ideal environment for continued growth and success in life sciences imaging.

For more information about this topic including a catalogue of imaging researchers, information regarding why imaging researchers are choosing Alberta and more information about the ALSI, please visit: www.technology.gov.ab.ca and click on 'Alberta Life Sciences Institute' or contact reception at (780) 427-1956.

The ALSI would like thank the hundreds of researchers who generously contributed their time, insights and talents to ensure the success of this document.



ALBERTA ADVANCED EDUCATION AND TECHNOLOGY CATALOGUING IN PUBLICATION DATA

Life sciences imaging in Alberta.

Sponsors: Alberta Life Sciences Institute (ALSI); Alberta Advanced Education and Technology.
ISBN 978-0-7785-6428-7
1. Imaging systems -- Alberta. 2. Imaging systems in medicine. 3. Diagnostic imaging – Alberta.
4. Magnetic resonance imaging – Alberta. 5. Tomography, Emission – Alberta. I. Title.
II. Alberta Life Sciences Institute. III. Alberta Advanced Education and Technology.

RC 78.7.D53 I31 2008 616.075 4
Printed in Alberta February 2008

Alberta
Life Sciences Institute

EllipsisVentures...
designed and produced by nonfiction studios inc.